SureServo® AC Servo System Configuration

*Sure*Servo series drives and motors part numbering system

SV A - 2 04 0

Series
SV: *Sure*Servo AC servo

Component Type
A: Drive
L: Low inertia motor
M: Medium inertia motor

Component Option
0: Drive
Blank: Motor without brake
B: Motor with brake

Rated Output Power
01: 100W
02: 200W
04: 400W
07: 750W
10: 1000W
20: 2000W
30: 3000W

Nominal Input Voltage
2: 230VAC; 50/60 Hz

Here is what you will need to order a complete servo system:

NOTE: UNIT CAN BE PROGRAMMED VIA KEYPAD.
OPTIONAL PROGRAMMING SOFTWARE (FREE DOWNLOAD) AND OPTIONAL PROGRAMMING CABLE AVAILABLE.

If you need a gear box for your configuration, you can
http://www.sureservo.com/gearbox/selector

*Sure*Servo AC servo drive, motor, and cable combinations

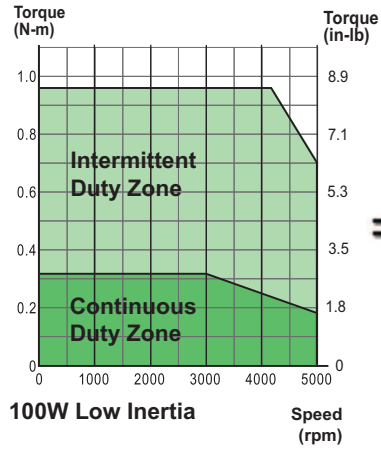
Inertia & Power		Drive and Motor			Power Cables (from Drive to Motor)				Encoder Feedback Cables				Miscellaneous	
Inertia	*Power*	*Servo Drive*	*Servo Motor without brake (note)*	*Servo Motor with brake (note)*	*10 ft*	*20 ft*	*30 ft*	*60 ft*	*10 ft*	*20 ft*	*30 ft*	*60 ft*	*ZIPLink I/O Interface*	*RS-422/485 Serial Communication Cable*
Low inertia	100W	SVA-2040	SVL-201	SVL-201B	SVC-PFL-010	SVC-PFL-020	SVC-PFL-030	SVC-PFL-060	SVC-EFL-010	SVC-EFL-020	SVC-EFL-030	SVC-EFL-060	ZL-RTB50 *and* ZL-SVC-CBL50 or ZL-SVC-CBL50-1 or ZL-SVC-CBL50-2	SVC-MDCOM-CBL
	200W		SVL-202	SVL-202B										
	400W		SVL-204	SVL-204B										
	750W	SVA-2100	SVL-207	SVL-207B										
	1000W		SVL-210	SVL-210B	SVC-PHM-010	SVC-PHM-020	SVC-PHM-030	SVC-PHM-060	SVC-EHH-010	SVC-EHH-020	SVC-EHH-030	SVC-EHH-060		
Medium inertia	1000W		SVM-210	SVM-210B										
	2000W	SVA-2300	SVM-220	SVM-220B	SVC-PHH-010	SVC-PHH-020	SVC-PHH-030	SVC-PHH-060						
	3000W		SVM-230	SVM-230B										

NOTE: EACH SERVO MOTOR REQUIRES AN ENCODER FEEDBACK CABLE AND A POWER CABLE.
THE MOTOR POWER CABLE INCLUDES BRAKE POWER WIRES FOR THE OPTIONAL MOTOR BRAKE.

SureServo® AC Servo System Configuration

For all systems:
Order programming software & programming cable if needed. See pgs. MC-35 & MC-36.

100W Low Inertia System



1.

Servo Drive
SVA-2040 $488.00

J_m= Motor Inertia = 0.000027 lb-in-s² (0.000003 kg - m²)

*Sure*Servo Motor

2.

SVL-201	$325.00
SVL-201B (w/brake)	$525.00

Motor Power Cable (1)

3.

SVC-PFL-010 (10')	$29.50
SVC-PFL-020 (20')	$52.00
SVC-PFL-030 (30')	$63.00
SVC-PFL-060 (60')	$115.00

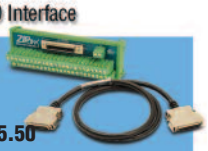
Motor Encoder Cable (1)

4.

SVC-EFL-010 (10')	$49.50
SVC-EFL-020 (20')	$73.00
SVC-EFL-030 (30')	$87.00
SVC-EFL-060 (60')	$113.00

*ZIP*Link I/O Interface

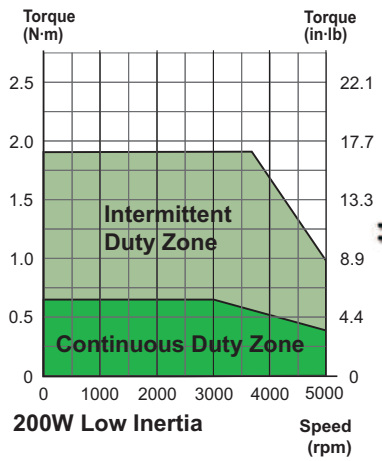
5.



ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

200W Low Inertia System



1.

Servo Drive
SVA-2040 $488.00

J_m= Motor Inertia = 0.00016 lb-in-s² (0.000018 kg - m²)

*Sure*Servo Motor

2.

SVL-202	$393.00
SVL-202B (w/brake)	$581.00

Motor Power Cable (1)

3.

SVC-PFL-010 (10')	$29.50
SVC-PFL-020 (20')	$52.00
SVC-PFL-030 (30')	$63.00
SVC-PFL-060 (60')	$115.00

Motor Encoder Cable (1)

4.

SVC-EFL-010 (10')	$49.50
SVC-EFL-020 (20')	$73.00
SVC-EFL-030 (30')	$87.00
SVC-EFL-060 (60')	$113.00

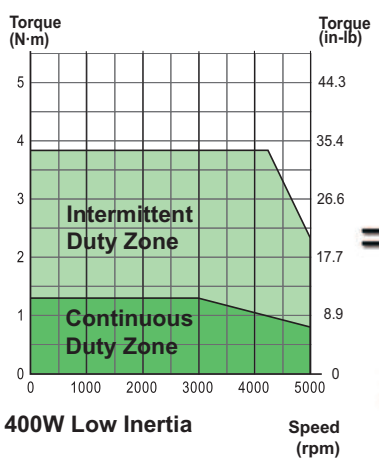
*ZIP*Link I/O Interface

5.

ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

400W Low Inertia System



1.

Servo Drive
SVA-2040 $488.00

J_m= Motor Inertia =0.0003 lb-in-s² (0 .000034 kg - m²)

*Sure*Servo Motor

2.

SVL-204	$481.00
SVL-204B (w/brake)	$678.00

Motor Power Cable (1)

3.

SVC-PFL-010 (10')	$29.50
SVC-PFL-020 (20')	$52.00
SVC-PFL-030 (30')	$63.00
SVC-PFL-060 (60')	$115.00

Motor Encoder Cable (1)

4.

SVC-EFL-010 (10')	$49.50
SVC-EFL-020 (20')	$73.00
SVC-EFL-030 (30')	$87.00
SVC-EFL-060 (60')	$113.00

*ZIP*Link I/O Interface

5.

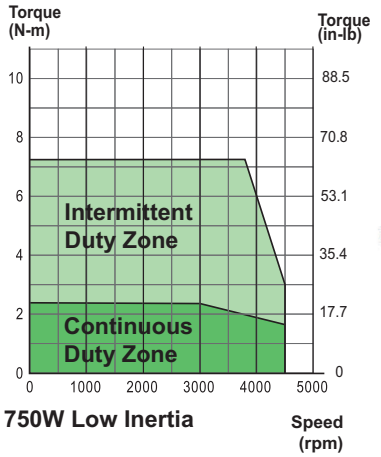
ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

SureServo® AC Servo System Configuration

For all systems:
Order programming software & programming cable if needed.
See pgs. MC-35 & MC-36.

750W Low Inertia System



1. = Servo Drive **SVA-2100 $632.00**

*Sure*Servo Motor

2.

SVL-207	$514.00
SVL-207B (w/brake)	$734.00

Motor Power Cable (1)

3.

SVC-PFL-010 (10')	$29.50
SVC-PFL-020 (20')	$52.00
SVC-PFL-030 (30')	$63.00
SVC-PFL-060 (60')	$115.00

Motor Encoder Cable (1)

4.

SVC-EFL-010 (10')	$49.50
SVC-EFL-020 (20')	$73.00
SVC-EFL-030 (30')	$87.00
SVC-EFL-060 (60')	$113.00

*ZIP*Link I/O Interface

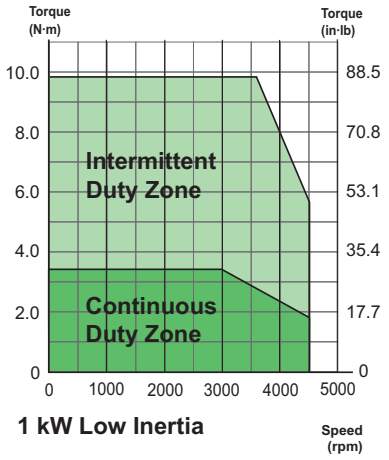
5.

ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

J_m= Motor Inertia = .00096 lb-in-s² (0.000108 kg - m²)

1 kW Low Inertia System



1. = Servo Drive **SVA-2100 $632.00**

*Sure*Servo Motor

2.

SVL-210	$613.00
SVL-210B (w/brake)	$919.00

Motor Power Cable (1)

3.

SVC-PHM-010 (10')	$85.00
SVC-PHM-020 (20')	$95.00
SVC-PHM-030 (30')	$117.00
SVC-PHM-060 (60')	$181.00

Motor Encoder Cable (1)

4.

SVC-EHH-010 (10')	$81.00
SVC-EHH-020 (20')	$93.00
SVC-EHH-030 (30')	$104.00
SVC-EHH-060 (60')	$134.00

*ZIP*Link I/O Interface

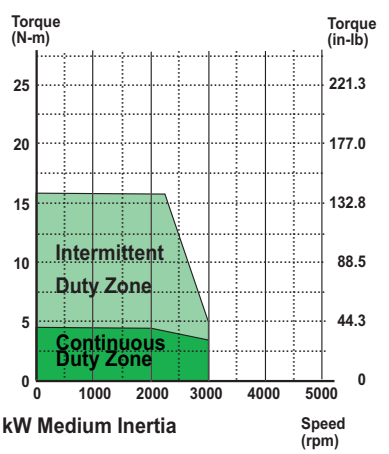
5.

ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

J_m= Motor Inertia = .0023 lb-in-s² (0.00026 kg - m²)

1 kW Medium Inertia System



1. = Servo Drive **SVA-2100 $632.00**

*Sure*Servo Motor

2.

SVM-210	$788.00
SVM-210B (w/brake)	$1,095.00

Motor Power Cable (1)

3.

SVC-PHM-010 (10')	$85.00
SVC-PHM-020 (20')	$95.00
SVC-PHM-030 (30')	$117.00
SVC-PHM-060 (60')	$181.00

Motor Encoder Cable (1)

4.

SVC-EHH-010 (10')	$81.00
SVC-EHH-020 (20')	$93.00
SVC-EHH-030 (30')	$104.00
SVC-EHH-060 (60')	$134.00

*ZIP*Link I/O Interface

5.

ZL-RTB50 $45.50
and one cable below:

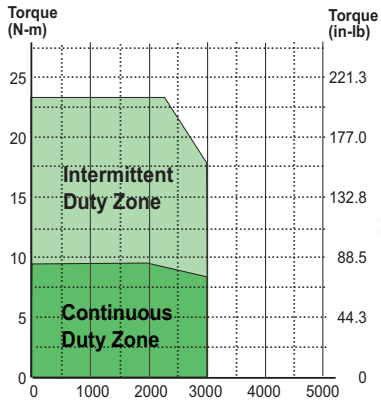
ZL-SVC-CBL50 (0.5m)	$33.50
ZL-SVC-CBL50-1 (1m)	$34.50
ZL-SVC-CBL50-2 (2m)	$36.50

J_m= Motor Inertia = .0053 lb-in-s² (0.000598 kg - m²)

SureServo® AC Servo System Configuration

For all systems:
Order programming software & programming cable if needed.
See pgs. MC-35& MC-36.

2 kW Medium Inertia System



2 kW Medium Inertia

1.

Servo Drive
SVA-2300 $1,054.00

*Sure*Servo Motor

2.

SVM-220	**$832.00**
SVM-220B (w/brake)	**$1,138.00**

Motor Power Cable (1)

3.

SVC-PHH-010 (10')	**$103.00**
SVC-PHH-020 (20')	**$133.00**
SVC-PHH-030 (30')	**$165.00**
SVC-PHH-060 (60')	**$265.00**

Motor Encoder Cable (1)

4.

SVC-EHH-010 (10')	**$81.00**
SVC-EHH-020 (20')	**$93.00**
SVC-EHH-030 (30')	**$104.00**
SVC-EHH-060 (60')	**$134.00**

*ZIP*Link I/O Interface

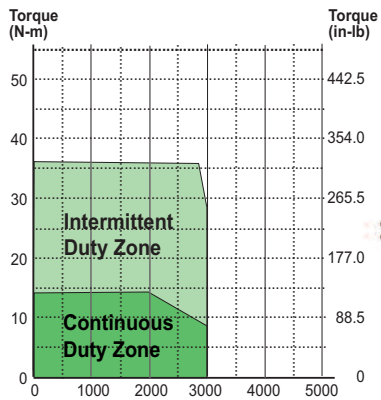
5.

ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	**$33.50**
ZL-SVC-CBL50-1 (1m)	**$34.50**
ZL-SVC-CBL50-2 (2m)	**$36.50**

J_m= Motor Inertia = .014 lb-in-s^2 = (0.00158 kg - m^2)

3 kW Medium Inertia System



3 kW Medium Inertia

1.

Servo Drive
SVA-2300 $1,054.00

*Sure*Servo Motor

2.

SVM-230	**$1,270.00**
SVM-230B (w/brake)	**$1,577.00**

Motor Power Cable (1)

3.

SVC-PHH-010 (10')	**$103.00**
SVC-PHH-020 (20')	**$133.00**
SVC-PHH-030 (30')	**$165.00**
SVC-PHH-060 (60')	**$265.00**

Motor Encoder Cable (1)

4.

SVC-EHH-010 (10')	**$81.00**
SVC-EHH-020 (20')	**$93.00**
SVC-EHH-030 (30')	**$104.00**
SVC-EHH-060 (60')	**$134.00**

*ZIP*Link I/O Interface

5.

ZL-RTB50 $45.50
and one cable below:

ZL-SVC-CBL50 (0.5m)	**$33.50**
ZL-SVC-CBL50-1 (1m)	**$34.50**
ZL-SVC-CBL50-2 (2m)	**$36.50**

J_m= Motor Inertia = 0.038 lb-in-s^2 = (0.00433 kg - m^2)

NOTE: ALL MOTOR POWER CABLES INCLUDE BRAKE POWER WIRES FOR THE OPTIONAL MOTOR BRAKE.

*Sure*Servo Communications Cables for Muti-drop Networks

Product	Price	Description
SVC-MDCOM-CBL	$18.00	RS-422/485 serial communication cable for use with multidrop networks; 3ft length; IEEE 1394 plug to unterminated wires; compatible with all *Sure*Servo systems. Facilitates connection between the *Sure*Servo drive serial port and host controllers.
SVC-232RJ12-CBL-2 *	$7.00	*ZIP*Link SureServo Drives cable with 6-pin RJ12 connector to a 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. For RS-232 connection to all *Sure*Servo amplifiers.
SVC-485RJ12-CBL-2 *	$9.00	*ZIP*Link SureServo amplifier communication cable, RJ12 male to 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. Cable used in conjunction with **ZL-CDM-RJ12**xxx distribution module can access a compatible RS-485 device network.
SVC-485HD15-CBL-2 *	$7.50	*ZIP*Link SureServo Drives cable with a HD 15-pin male to a 6-pin IEEE 1394 connector, shielded, twisted pair, 2.0 meter (6.6 ft.) length. For RS-485 connection to all *Sure*Servo amplifiers.

**** Refer to the ZIPLinks Wiring Solutions section for complete information regarding the ZIPLink cables.***

AC Servo Drive Specifications

Servo drive overview

Keypad
Five Function keys:

MODE:	Press to select or change mode
NEXT:	Press to shift left
UP:	Press to increase values
DOWN:	Press to decrease values
ENTER:	Press to enter value

LED Display
The LED display has 5 full digits and is used to indicate servo status and alarms

Power On LED
Main power is ON

Control Power Terminal
Single-phase power 230 VAC, 50/60 Hz is connected to L1 and L2

Main Power Terminal
Three-phase power 230 VAC, 50/60 Hz is connected to R, S and T
(Single-phase power 230 VAC 50/60 Hz may be connected to R and S for the low inertia systems)

Motor Output Terminal
The servo motor power cable is connected to U, V and W. Use our factory made and tested cables available in 10, 20, 30 or 60 foot lengths for easy connection.

Regenerative Resistor Terminal
1. When the internal regenerative resistor is used, the P and D terminal are connected together while the P and C connection is left open.
2. When an external regenerative resistor is used, it is connected across the P and C terminals while the P and D connection is left open. Use our factory approved resistors for "sure" results.

I/O Interface
50-pin connector for interfacing the host controller (such as *Direct*LOGIC PLC) and other types of I/O signals.

Use our *ZIP*Link kit which provides DIN-rail mounted screw terminals for easy connection.
- Command inputs:
  - Pulse and Direction
  - Encoder Follower
  - Analog Velocity/Torque
- (8) Digital Inputs
- (5) Digital Outputs
- (2) Analog Monitors
- Encoder Output (scalable)
  A+, A-, B+, B-, Z+, Z-

Encoder Interface
20-pin connector for interfacing the servo motor encoder.
Use our factory-made and tested cable available in 10, 20, 30 or 60 foot lengths for easy connection.

Serial Communication Interface
6-pin RS-485/422/232 interface to personal computer with *Sure*Servo Pro set-up software or host controller with Modbus RTU/ASCII protocol. Use our factory-made cables for easy connection to the PC or the host controller.

*Sure*Servo systems run "out-of-the-box"… but may be reconfigured for many applications!

The *Sure*Servo drives are fully digital and include over 165 programmable parameters. For convenience, the parameters are grouped into five categories:

1) Monitor parameters
2) Basic parameters
3) Extended parameters
4) Communication parameters
5) Diagnostic parameters.

All parameters have commonly used default values which allow you to operate the *Sure*Servo system "out-of-the-box". However, the programmability and large variety of parameters make the SureServo systems suitable for a very broad range of applications, including almost all types of general purpose industrial machinery such as assembly, test, packaging, machine tool, and robotics.

SureServo® AC Servo Drive Specifications

Servo drive specifications

General Drive Specifications	
Permissible Frequency	50/60 Hz ±5%
Encoder Resolution / Feedback Resolution	2500 lines / 10000 ppr
Control of Main Circuit	SVPWM (Space Vector Pulse Width Modulation) Control
Tuning Modes	Easy / Auto / Manual
Dynamic Brake	Built-in control
Analog Monitor Outputs (2)	Monitor signal can be set by parameters (Output voltage range: ±8V; Resolution: 12.8 mV/count)
8 Programmable Digital Inputs (45 selectable functions)	Servo enable, Alarm reset, Gain switching, Pulse counter clear, Fault stop, CW/CCW over-travel
	Internal parameter selection, Torque limit activation, Velocity limit activation, Control mode selection
Scalable Encoder Output	Encoder signal output A, /A, B, /B, Z /Z, Line Driver
5 Programmable Outputs (9 selectable indicators)	Servo ready, Servo On, Low velocity, Velocity reached, In Position, Torque limiting, Servo fault, Electromagnetic brake control, Home search completed
Communication Interface	RS-232 / RS-485 / RS-422 / Modbus ASCII & RTU up to 115k Baud
Protective Functions	Overcurrent, Overvoltage, Undervoltage, Overload, Excessive velocity/position error, Encoder error, Regeneration error, Communication error
Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)
Altitude	1000m [3281 ft] above sea level – maximum
Operating Temperature	0 to 55 °C [32 to 131 °F] (If operating temperature is above 55°C, forced cooling is required). For long-term reliability, the ambient temperature of *Sure*Servo systems should be under 45°C (113°F).
Storage Temperature	-20° to 65°C (-4° to 149°F)
Humidity	0 to 90% (non-condensing)
Vibration	9.81 m/s^2 (1G) less than 20Hz, 5.88 m/s^2 (0.6G) 20 to 50 Hz
Protection	IP 20
Agency Approvals	CE; UL listed (U.S. and Canada)

Sure servo® AC Servo Drive Specifications

Servo drive specifications (continued)

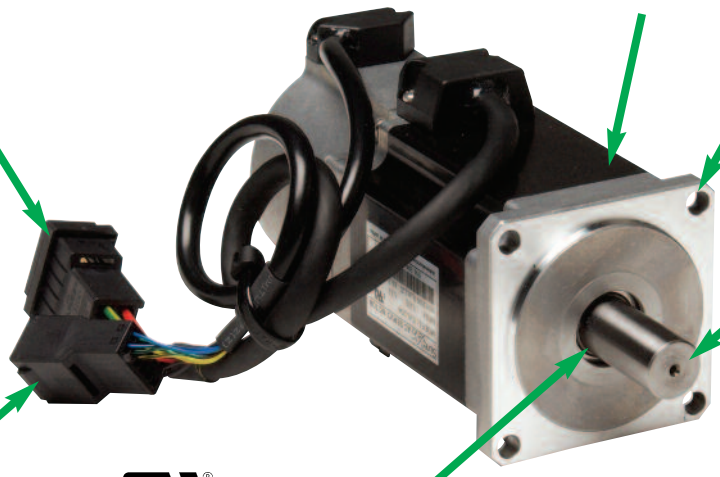
Model and Mode Specific Drive Specifications										
	AC Servo Model		**SVA-2040**			**SVA-2100**			**SVA-2300**	
	Price		$488.00			$632.00			$1,054.00	
	Voltage Phase		Single-phase or Three-phase						Three-phase	
	Voltage and Frequency Range		3-phase: 170~255 VAC @ 50/60 Hz ±5%; 1-phase: 200~255 VAC @ 50/60 Hz ±5%						170~255 VAC @ 50/60 Hz ±5%	
	Main Circuit Input Current	**Single Phase**	3.4A @ 400W			8.0A @ 1kW			–	
		Three Phase	2.6A @ 400W			6.2A @ 1kW			13.6A @ 3kW	
	Main Circuit Inrush Current		44A			77A			87A	
	Main Circuit Power Cycling		Maximum 1 power cycle per minute							
	Control Circuit Current and Voltage		43 mA @ 200~255 VAC, 1 phase							
	Control Circuit Inrush Current		32A maximum							
	Cooling System		Natural Air Circulation			Internal Cooling Fan				
	Drive Heat Loss *	**Motor driven ***	SVL-201(B)	SVL-202(B)	SVL-204(B)	SVL-207(B)	SVL-210(B)	SVM-210(B)	SVM-220(B)	SVM-230(B)
		Heat Loss	12W	15W	20W	35W	45W	50W	75W	80W
	Weight		1.5 kg [3.3 lb]			2kg [4lb]			3kg [7lb]	
Position Control Mode	**Max. Input Pulse Frequency**		Max. 500 kpps (Line driver); Max. 200 kpps (Open collector)							
	Pulse Type		Pulse + Direction, A phase + B phase Quadrature, CCW pulse + CW pulse							
	Command Source		External pulse train / Onboard indexer							
	Smoothing Strategy		Low-pass and P-curve filter							
	Electronic Gear		Electronic gear N/M multiple; N: 1~32767, M: 1~32767(1/50<N/M<200)							
	Torque Limit Operation		Set by parameters or by analog input							
	Feed Forward Compensation		Set by parameters							
Velocity Control Mode	**Analog Input Command**	**Voltage Range**	Bipolar ±10 VDC							
		Input Resistance	10 kΩ							
		Time Constant	2.2 µs							
		Resolution	(Varies with input voltage) 13 bits @ 0V~1V; 13~10 bits @ 1V~2V; 10 bits @ 2V~10V							
	Speed Control Range		1:5000							
	Command Source		External analog signal / Onboard indexer							
	Smoothing Strategy		Low-pass and S-curve filter							
	Torque Limit Operation		Set by parameters or via analog input							
	Frequency Response Characteristic		Maximum 450 Hz							
	Speed Accuracy (at rated rotation speed)		0.01% or less at 0 to 100% load fluctuation							
			0.01% or less at ±10% power fluctuation							
			0.01% or less at 0 to 50°C ambient temperature fluctuation							
Torque Control Mode	**Analog Input Command**	**Voltage Range**	Bipolar ±10 VDC							
		Input Resistance	10 kΩ							
		Time Constant	2.2 µs							
		Resolution	10 bits							
	Permissible Time for Overload		8 sec. under 200% rated output							
	Command Source		External analog signal / Onboard indexer							
	Smoothing Strategy		Low-pass filter							
	Speed Limit Operation		Set by parameters or via analog input							

**** Drive heat loss varies depending upon which motor is connected to the drive.***

SureServo® AC Servo Motor Specifications

Servo motor overview

750W and below



Motor Power and Brake Connector
1-foot cable with 6-position connector (Not liquid tight)

Encoder Connector
1-foot cable with 9-position connector (Not liquid tight)

IP65 Housing

Low Inertia Motors
- 100W 40 mm flange
- 200W 60 mm flange
- 400W 60 mm flange
- 750W 80 mm flange

Keyless Shafts
- 100W 8 mm diameter
- 200W 14 mm diameter
- 400W 14 mm diameter
- 750W 19 mm diameter

***Without* Shaft Seal**
(not liquid tight)

All SureServo motors have keyless shafts for use with servo-grade clamp or compression couplings.

1 kW and above

Motor Power and Brake Connector
(Liquid tight when using AutomationDirect cables)

Encoder Connector
(Liquid tight when using AutomationDirect cables)

IP65 Housing

Low and Medium Inertia Motors
Low Inertia Model
- 1 kW 100 mm flange

Medium Inertia Models
- 1 kW 130 mm flange
- 2 kW 180 mm flange
- 3 kW 180 mm flange

Keyless Shafts
Low Inertia Model
- 1 kW 22 mm diameter

Medium Inertia Models
- 1 kW 22 mm diameter
- 2 kW 35 mm diameter
- 3 kW 35 mm diameter

***With* Shaft Seal**
(liquid tight)

Sure servo® AC Servo Motor Specifications

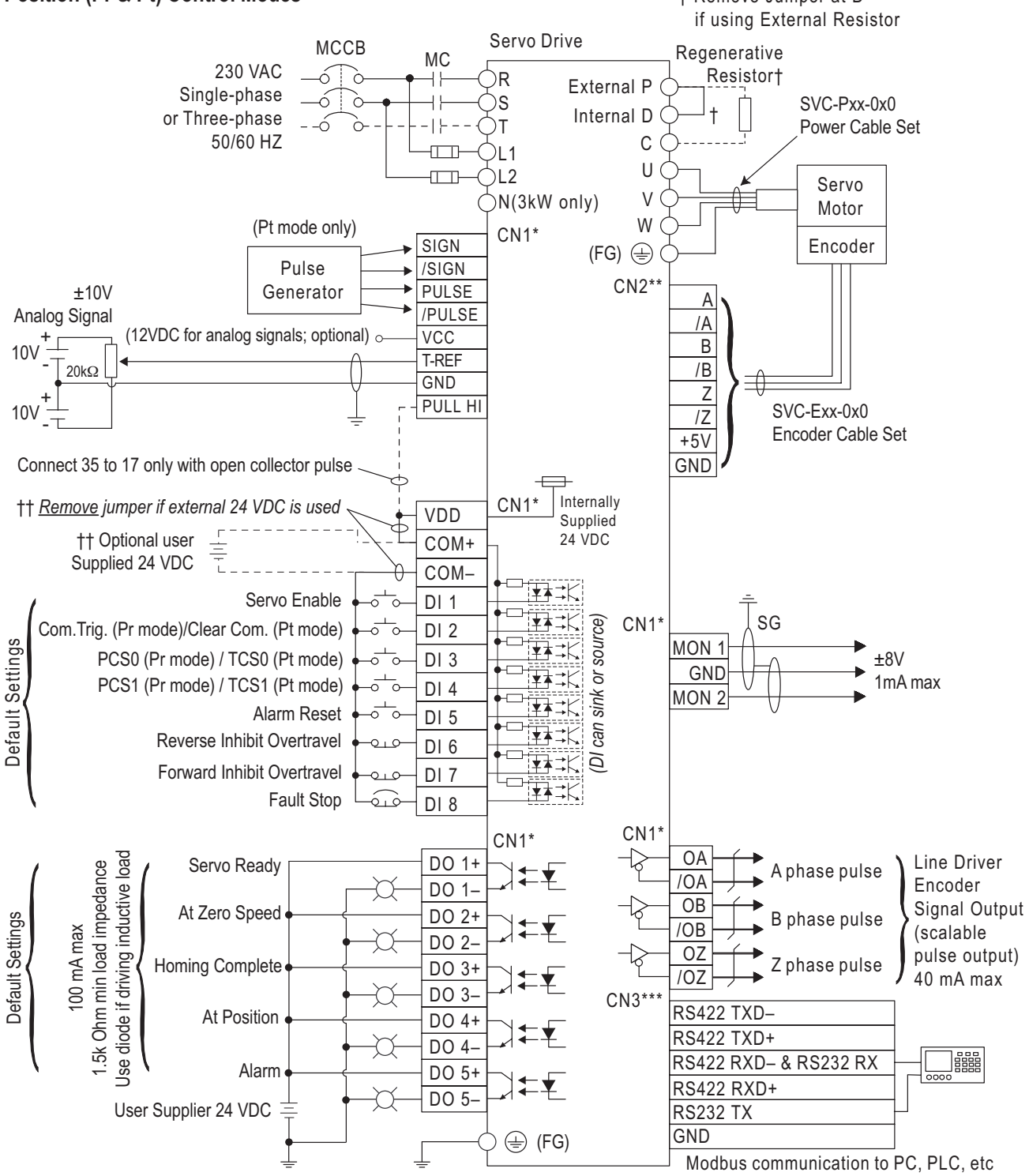
Motor Specifications									
Inertia Range			Low					Medium		
Model Name: Sxx-xxx			SVL-201	SVL-202	SVL-204	SVL-207	SVL-210	SVM-210	SVM-220	SVM-230
Price			$325.00	$393.00	$481.00	$514.00	$613.00	$788.00	$832.00	$1,270.00
Model with brake: Sxx-xxxB			SVL-201B	SVL-202B	SVL-204B	SVL-207B	SVL-210B	SVM-210B	SVM-220B	SVM-230B
Price			$525.00	$581.00	$678.00	$734.00	$919.00	$1,095.00	$1,138.00	$1,577.00
Rated output power		W	100	200	400	750	1000	1000	2000	3000
Rated torque		N·m	0.32	0.64	1.27	2.39	3.3	4.8	9.4	14.3
		lb·in	2.8	5.7	11.2	21.2	29.2	42.5	83.2	126.6
Maximum torque		N·m	0.95	1.91	3.82	7.16	9.9	15.7	23.5	35.8
		lb·in	8.4	16.9	33.8	63.4	87.6	138.9	208.0	316.8
Rated speed		rpm	3000					2000		
Max. speed		rpm	5000			4500		3000		
Rated current		A	1.1	1.7	3.3	5.0	6.8	5.6	13.1	17.4
Max. current		A	3.0	4.9	9.3	14.1	18.7	17.6	31.4	42.3
Drive input current		1 phase A	1.0	1.7	3.4	5.9	8.0	8.0	-	-
		3 phase A	0.8	1.3	2.6	4.7	6.2	6.2	9.1	13.6
Max. radial shaft load		N	78.4	196		343	490		784	
		lb	18	44		77	110		176	
Max. thrust shaft load		N	39.2	68.6		98			392	
		lb	9	15		22			88	
Brake	Voltage	VDC	24							
	Current	ADC	0.21	0.38		0.4	0.75	0.83	1.45	1.67
	Holding Torque	N·m	0.32	1.27		2.55	9.3	7.5	32.0	50.0
		lb·in	2.83	11.24		22.57	82.3	66.38	283.2	442.5
Rotor inertia w/o brake		$kg·m^2$	0.03E-4	0.18E-4	0.34E-4	1.08E-4	2.6E-4	5.98E-4	15.8E-4	43.3E-4
		$lb·in·s^2$	0.27E-4	1.59E-4	3.0E-4	9.56E-4	23.0E-4	52.9E-4	139.8E-4	383.2E-4
Rotor inertia with brake		$kg·m^2$	0.06E-4	0.28E-4	0.44E-4	1.32E-4	3.1E-4	8.8E-4	27.8E-4	56.3E-4
		$lb·in·s^2$	0.53E-4	2.48E-4	3.9E-4	11.7E-4	27.4E-4	77.9E-4	246.0E-4	498.3E-4
Mechanical time constant		ms	0.6	0.9	0.7	0.6	1.7	1.4	1.6	0.9
Static friction torque		N·m	0.02	0.04		0.08	0.49	0.29	0.98	
Torque constant-KT		N·m/A	0.32	0.39	0.4	0.5	0.56	0.91	0.77	0.86
Voltage constant-KE		V/rpm	33.7E-3	41.0E-3	41.6E-3	52.2E-3	58.4E-3	95.71E-3	81.1E-3	90.5E-3
Armature resistance		Ω	20.3	7.5	3.1	1.3	2.052	1.98	0.6	0.162
Armature inductance		mH	32	24	11	6.3	8.4	13.2	6.1	2.3
Electrical time constant		ms	1.6	3.2	3.2	4.8	4.1	6.7	10.1	14.2
Motor Type			Brushless, AC, permanent magnet [Neodymium (Nd), Iron (Fe), Boron (B)]							
Insulation class			Class F							
Insulation resistance			>100 MΩ , 500 VDC							
Insulation strength			1500 VAC, 50 Hz, 60 seconds							
Ambient temperature range			0 to 40°C (32°F to 104°F)							
Operating temperature *(measured case temperature)*			70°C (158°F)							
Maximum operating temperature *(measured case temperature)*			70°C + 40°C = 110°C (230°F)							
Storage temperature			-20 to 65°C (-4 to 149°F)							
Operating humidity			20 to 90% RH (non-condensing)							
Storage humidity			20 to 90% RH (non-condensing)							
Vibration / Shock			2.5G / 5.0G							
Environmental rating			IP65 motor body; IP40 shaft; IP20 connector				IP65 (requires *Sure*Servo cables)			
Weight without brake		kg	0.5	0.9	1.3	2.5	4.7	4.8	12.0	17.0
		lb	1.1	1.98	2.87	5.5	10.36	10.58	26.46	37.48
Weight with brake		kg	0.7	1.4	1.8	3.4	6.3	7.5	19.0	24.0
		lb	1.54	3.09	3.97	7.5	13.89	16.53	41.89	52.9
Agency Approvals			CE; UL recognized (U.S. and Canada)							
NOTE: U.S. customary units are for reference only.										

Sure servo AC Servo System Wiring

Standard wiring examples

This wiring diagram shows basic wiring only, and additional wiring configurations are possible for some I/O. Refer to the "Installation and Wiring" chapter of the User Manual for more detailed wiring information.

Position (Pr & Pt) Control Modes



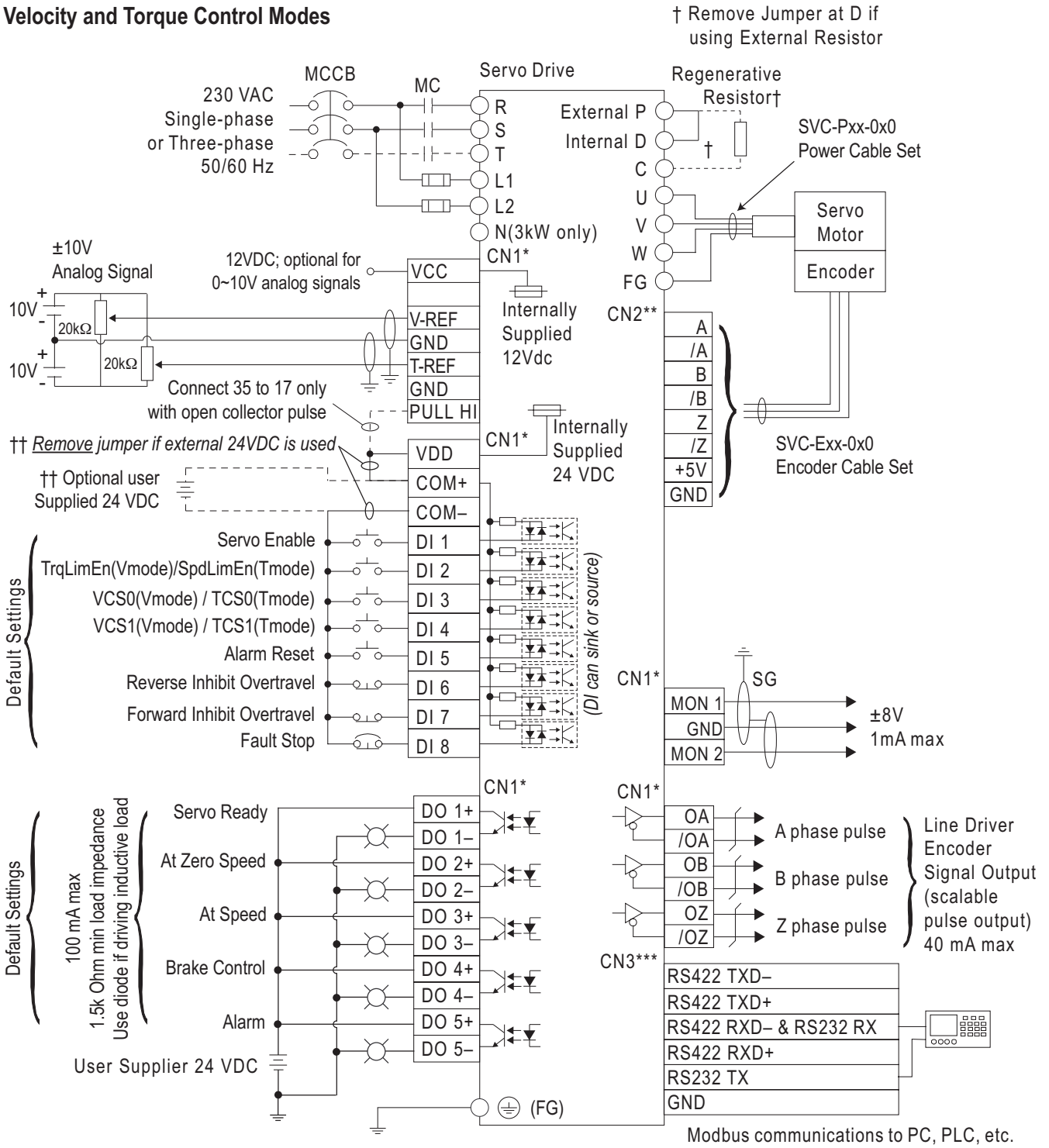
* Use connection kit part #s ZL-RTB50 & ZL-SVC-CBL-50(-x) for CN1 terminal connections.
** Use cable part # SVC-Exx-0x0 for CN2 terminal connections.
*** Use cable part # SVC-MDCOM-CBL for CN3 terminal Modbus network connections.

AC Servo System Wiring

Standard wiring examples (continued)

This wiring diagram shows basic wiring only, and additional wiring configurations are possible for some I/O. Refer to the "Installation and Wiring" chapter of the User Manual for more detailed wiring information.

Velocity and Torque Control Modes



* Use connection kit part #s ZL-RTB50 & ZL-SVC-CBL-50(-x) for CN1 terminal connections.
** Use cable part # SVC-Exx-0x0 for CN2 terminal connections.
*** Use cable part # SVC-MDCOM-CBL for CN3 terminal Modbus network connections.

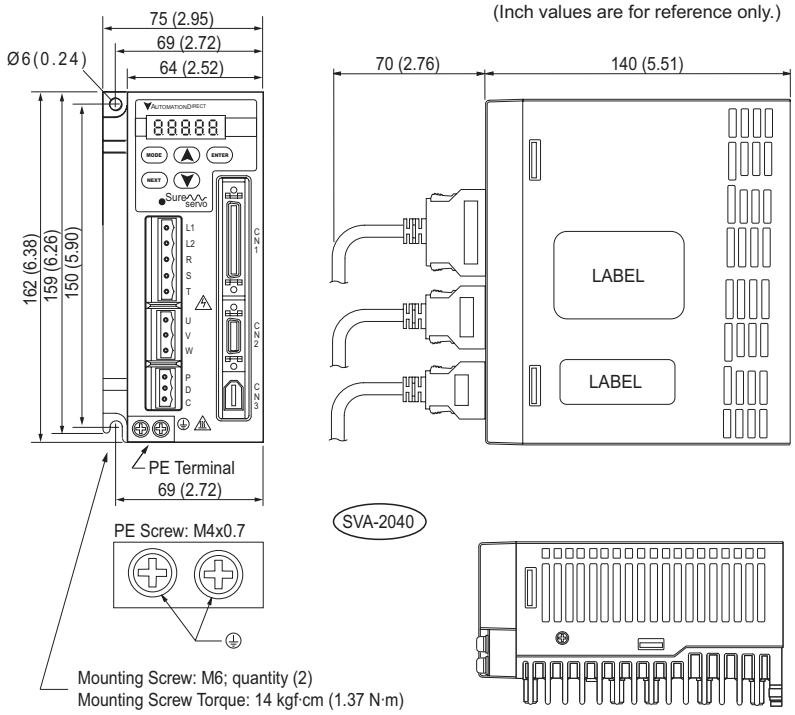
Sure servo AC Servo System Dimensions

Servo drive dimensions

SVA-2040

Recommended user supplied mounting screw is M6. Tighten to 14 kgf·cm (1.37 N·m).

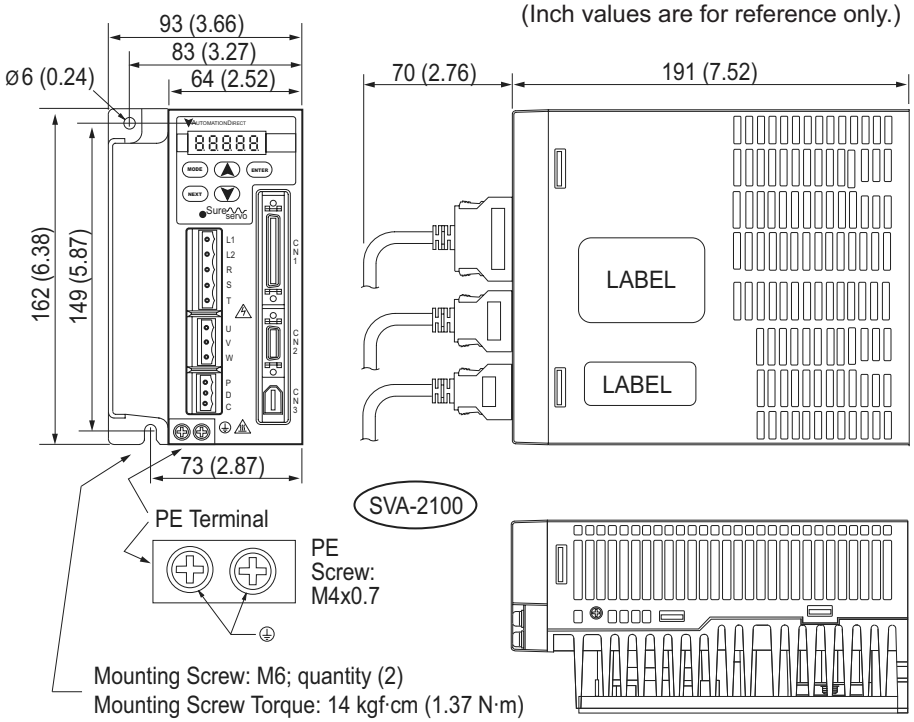
UNITS: mm (in)
(Inch values are for reference only.)



SVA-2100

Recommended user supplied mounting screw is M6. Tighten to 14 kgf·cm (1.37 N·m).

UNITS: mm (in)
(Inch values are for reference only.)



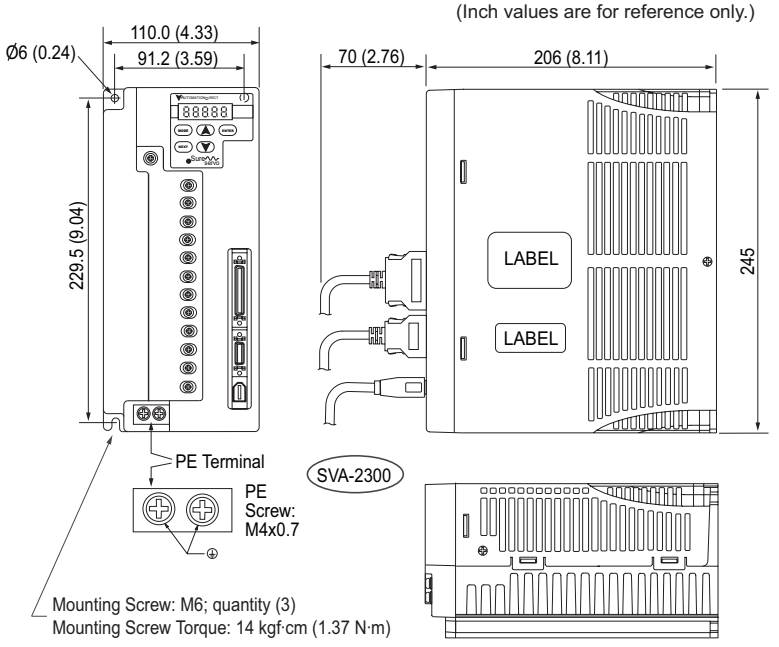
AC Servo System Dimensions

Servo drive dimensions (continued)

SVA-2300

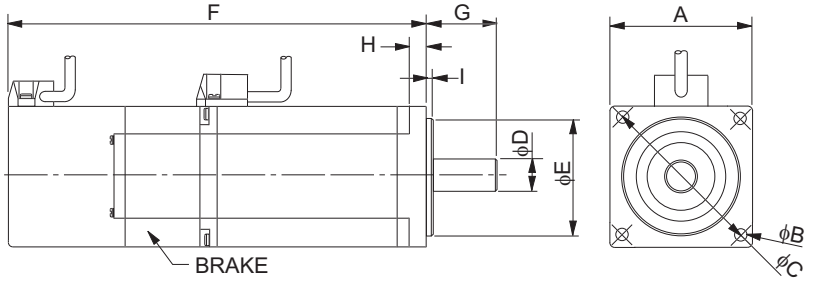
***NOTE:** RECOMMENDED USER SUPPLIED MOUNTING SCREW IS M6. TIGHTEN TO 14 KGF·CM (1.37 N·M).*

UNITS: mm (in)
(Inch values are for reference only.)



Servo motor dimensions

Low inertia models SVL-201(B), SVL-202(B), SVL-SVL-204(B), SVL-207(B)

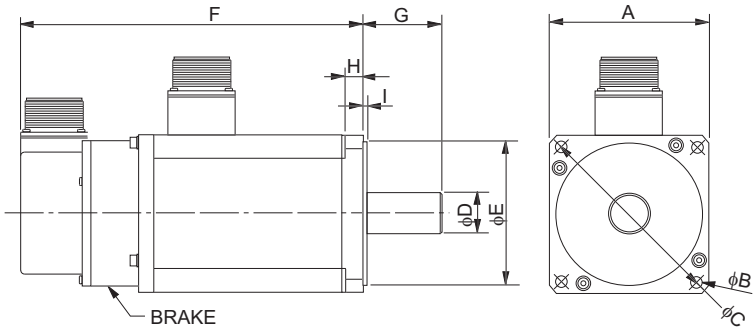


*Sure*Servo® Motor Dimensions -100W-750W Low Inertia				
Dimension	**SVL-201(B)**	**SVL-202(B)**	**SVL-204(B)**	**SVL-207(B)**
A	40 [1.575]	60 [2.362]		80 [3.15]
B	4.5 [0.1772]	5.5 [0.2165]		6.6 [0.2598]
C	46 [1.811]	70 [2.756]		90 [3.543]
D	8 +0.0/-0.009 (8h6)	14 +0.0/-0.011 (14h6)		19 +0.0 -0.013 (19h6)
E	30 +0.0/-0.021 (30h7)	50 +0.0/-0.025 (50h7)		70 +0.0/-0.030 (70h7)
F (w/o brake)	100.1 [3.941]	102.4 [4.032]	124.4 [4.898]	135 [5.315]
F (with brake)	135.7 [5.343]	137 [5.394]	159 [6.26]	171.6 [6.756]
G	25 [0.98]	30 [1.18]		35 [1.38]
H	5 [0.197]	6 [0.236]		8 [0.315]
I	2.5 [0.098]	3 [0.118]		
Cable length	300mm (12 inches)			
UNITS: mm [in]. (Inches are for reference only; not included on diameter dimensions for accuracy.)				

SureServo® AC Servo System Dimensions

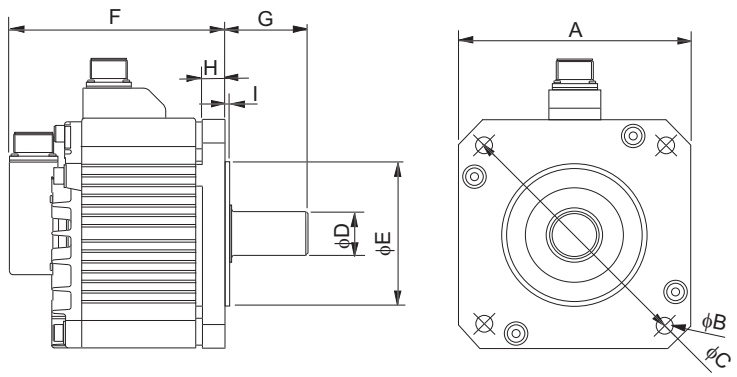
Servo motor dimensions (continued)

Low inertia models SVL-210(B)



SureServo® Motor Dimensions -1000W Low Inertia	
Dimension	**SVL-210(B)**
A	100 [3.937]
B	9 [0.3543]
C	115 +0.2/-0.2 [4.528]
D	22 +0.0/-0.013 (22h6)
E	95 +0.0/-0.035 (95h7)
F (w/o brake)	158 [6.22]
F (with brake)	190 [7.48]
G	45 [1.77]
H	17 [0.669]
I	7 [0.28]
UNITS: mm [in] (Inches are for reference only; not included on diameter dimensions for accuracy.)	

Medium inertia models SVM-210(B), SVM-220(B), SVM-230(B)



SureServo® Motor Dimensions -1000W-3000W Medium Inertia			
Dimension	**SVM-210(B)**	**SVM-220(B)**	**SVM-230(B)**
A	130 [5.118]	180 [7.087]	
B	9 [0.3543]	13.5 [0.5315]	
C	145 +0.2/-0.2 [5.709]	200 +0.2/-0.2 [7.874]	
D	22 +0.0/-0.013 (22h6)	35 +0.0/-0.016 (35h6)	
E	110 +0.0/-0.035 (110h7)	114.3 +0/-0.035 (114.3h7)	
F (w/o brake)	143 [5.63]	164 [6.457]	212 [8.35]
F (with brake)	181 [7.126]	213 [8.386]	258 [10.16]
G	55 [2.17]	75 [2.95]	
H	15 [0.591]	20 [0.787]	
I	4 [0.157]		
UNITS: mm [in] (Inches are for reference only; not included on diameter dimensions for accuracy.)			

SureGear® Precision Servo Gearboxes

SureGear® Servo Gearbox Overview

PGA In-line Series

The SureGear PGA series of high-precision servo gear reducers is an excellent choice for applications that require good accuracy and reliability at an exceptional value. This in-line planetary gear reducer has a thread-in mounting style, along with a level of precision and torque capacity that is best in its class. Offered in a concentric shaft design with a maximum seven arc-min backlash rating, the SureGear PGA series is an accurate, high-performance, and cost effective solution for any OEM.

The machining quality of the SureGear PGA helical planetary gears provides a very quiet and more efficient reducer than other competitive products that are similarly priced. The SureGear PGA series easily mates to SureServo motors, and is the perfect solution for applications such as gantries, injection-molding machines, pick-and-place automation, and linear slides.

SureGear PGA Gearbox

PGB Right-angle Series

The SureGear PGB series of high-precision right-angle servo gear reducers is an excellent choice for applications that require a more compact footprint.

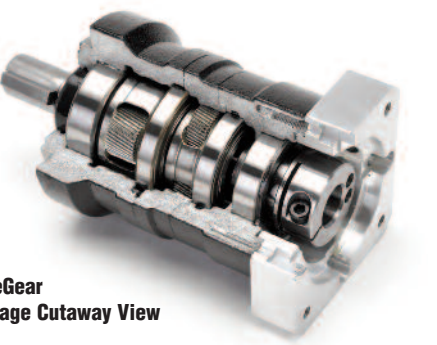
The PGB right-angle planetary gear reducers offer similar technical specifications to the PGA series in-line gear reducers, and provides the customer with an excellent solution when space and clearance requirements are limited.

Offered with a six arc-min backlash rating for 2-stage and nine arc-min backlash for 3-stage, the SureGear PGB series performs to OEMs' demanding expectations.

SureGear PGB Gearbox

Features

- Industry-standard mounting dimensions
- Thread-in mounting style
- Best-in-class backlash
- Four gear ratios available (5:1, 10:1, 15:1, 25:1)
- Mounting hardware included for attaching to SureServo motors
- Helical-cut planetary gears for quiet operation and reduced vibration
- Right-angle reducer utilizes a spiral bevel gear; motor can be located at a 90° position from the reducer, providing a more compact footprint
- Uncaged needle roller bearings for high rigidity and torque
- Adapter bushing connection for simple and effective attachment to most servo motors
- High-viscosity, anti-separation grease does not migrate away from the gears; no leakage through the seal
- Maintenance free: No need to replace the grease for the life of the unit
- At nominal speed, service life is 20,000 hours
- Can be positioned in any orientation
- IP55 environmental rating
- 5-year warranty



SureGear 2-Stage Cutaway View

Applications

- Gantries
- Injection-molding machines
- Pick-and-place automation
- Linear slides
- Packaging machines
- Conveyors

Sure gear Precision Servo Gearboxes

SureGear® Servo Gearbox Selection

SureGear® Servo Gearbox Selection

Sure Servo Motor	Gear Ratio	SureGear Gearbox	Frame Size (mm)	Motor Nominal Output Torque (N·m [lb·in])	Combination Nominal Output Torque (N·m [lb·in])	Combination Nominal Output Speed (rpm)	Combination Max Output Speed (rpm)	Available Load Inertia @ 5:1 Mismatch * (kg·cm² [lb·in·s²])	
		(PGx = PGA or PGB)						*PGAxxx-xxxx*	*PGBxxx-xxxx*
SVL-201(B)	5:1	PGA050-05A1	50	0.32 [2.8]	1.59 [14.1]	600	1,000	2.85 [0.003]	–
	10:1	PGA050-10A1			3.18 [28.1]	300	500	12.00 [0.011]	
	15:1	PGA050-15A1			4.77 [42.2]	200	333	25.88 [0.023]	
	25:1	PGA050-25A1			7.95 [70.4]	120	200	72.50 [0.064]	
	5:1	PGx070-05A1	70		1.59 [14.1]	600	1,000	1.83 [0.002]	-2.50 [-0.002] **
	10:1	PGx070-10A1			3.18 [28.1]	300	500	9.40 [0.008]	-8.00 [-0.007] **
	15:1	PGx070-15A1			4.77 [42.2]	200	333	21.38 [0.019]	17.33 [0.015]
	25:1	PGx070-25A1			7.95 [70.4]	120	200	60.63 [0.054]	49.38 [0.044]
SVL-202(B)	5:1	PGx070-05A2	70	0.64 [5.7]	3.20 [28.3]	600	1,000	18.50 [0.016]	34.50 [0.031]
	10:1	PGx070-10A2			6.40 [56.6]	300	500	76.00 [0.067]	140.00 [0.124]
	15:1	PGx070-15A2			9.60 [85.0]	200	333	171.00 [0.151]	355.95 [0.315]
	25:1	PGx070-25A2			16.00 [141.6]	120	200	481.25 [0.426]	990.63 [0.876]
	15:1	PGB090-15A2	90		9.60 [85.0]	200	333	–	1122.75 [0.993]
	25:1	PGB090-25A2			16.00 [141.6]	120	200		3125.00 [2.764]
SVL-204(B)	5:1	PGx070-05A2	70	1.27 [11.2]	6.35 [56.2]	600	1,000	38.50 [0.034]	34.50 [0.031]
	10:1	PGx070-10A2			12.70 [112.4]	300	500	156.00 [0.138]	140.00 [0.124]
	15:1	PGB090-15A2	90		19.05 [168.6]	200	333	–	290.25 [0.257]
	25:1	PGB090-25A2			31.75 [281.0]	120	200		812.50 [0.719]
SVL-207(B)	5:1	PGA070-05A3	70	2.39 [21.2]	11.95 [105.8]	600	900	126.00 [0.111]	–
	5:1	PGB090-05A3	90		11.95 [105.8]	600	900	–	81.75 [0.072]
	10:1	PGx090-10A3			23.90 [211.5]	300	450	465.00 [0.411]	338.00 [0.299]
	15:1	PGx090-15A3			35.85 [317.3]	200	300	1053.00 [0.931]	1080.00 [0.955]
	25:1	PGx090-25A3			59.75 [528.8]	120	180	2931.25 [2.593]	3006.25 [2.659]
SVL-210(B)	5:1	PGx090-05A4	90	3.30 [29.2]	16.50 [146.0]	600	900	252.50 [0.223]	218.50 [0.193]
	10:1	PGx090-10A4			33.00 [292.1]	300	450	1020.00 [0.902]	885.00 [0.783]
	15:1	PGx120-15A4	120		49.50 [438.1]	200	300	2295.00 [2.030]	1867.50 [1.652]
	25:1	PGx120-25A4			82.50 [730.2]	120	180	6375.00 [5.639]	5225.00 [4.622]
SVM-210(B)	5:1	PGA090-05A5	90	4.80 [42.5]	24.00 [212.4]	400	600	675.00 [0.597]	–
	10:1	PGA090-10A5			48.00 [424.8]	200	300	2710.00 [2.397]	
	5:1	PGB120-05A5	120		24.00 [212.4]	400	600	–	582.25 [0.515]
	10:1	PGB120-10A5			48.00 [424.8]	200	300		2385.00 [2.110]
	15:1	PGx120-15A5			72.00 [637.3]	133	200	6097.50 [5.393]	5670.00 [5.015]
	25:1	PGx120-25A5			120.00 [1062.1]	80	120	16937.50 [14.981]	15787.50 [13.964]
SVM-220(B)	5:1	PGx120-05A6	120	9.40 [83.2]	47.00 [416.0]	400	600	1700.00 [1.504]	1632.75 [1.444]
	10:1	PGx120-10A6			94.00 [832.0]	200	300	6800.00 [6.015]	6588.00 [5.827]
	15:1	PGx155-15A6	155		141.00 [1239.1]	133	200	15300.00 [13.533]	14384.25 [12.723]
	25:1	PGx155-25A6			235.00 [2079.9]	80	120	42500.00 [37.591]	40112.50 [35.480]
	5:1	PGB155-05A6			47.00 [416.0]	400	600	–	1443.00 [1.276]
	10:1	PGx-155-10A6			94.00 [832.0]	200	300	6800.00 [6.015]	5997.00 [5.304]
SVM-230(B)	5:1	PGx120-05A6	120	14.30 [126.6]	71.50 [632.8]	400	600	5137.50 [4.544]	5070.25 [4.485]
	10:1	PGx120-10A6			143.00 [1265.7]	200	300	20550.00 [18.176]	20338.00 [17.989]
	5:1	PGB155-05A6	155		71.50 [632.8]	400	600	–	4880.50 [4.317]
	10:1	PGx155-10A6			143.00 [1265.7]	200	300	20550.00 [18.176]	19747.00 [17.466]

**** Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)²***
A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

***** This gearbox is NOT a suitable choice at a 5:1 mismatch. If inertia balancing is a selection criteria for your end use, please use a mismatch of 8:1 to 10:1.***

SureGear® Precision Servo Gearboxes

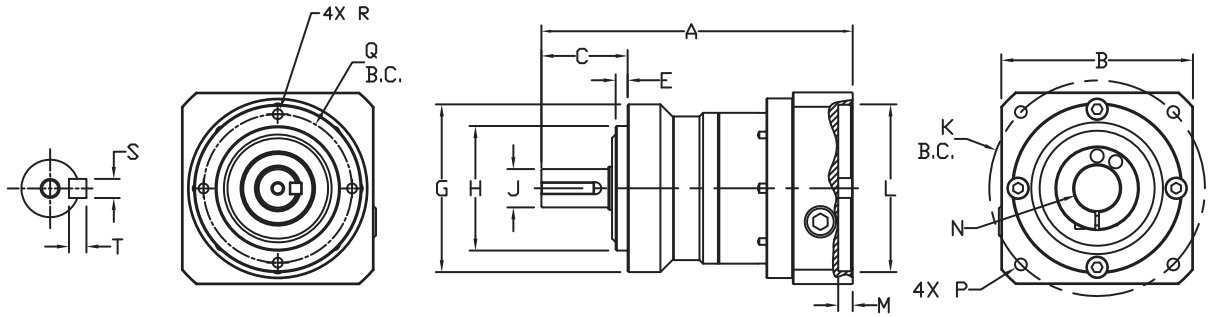
Pricing & Specifications – In-Line Shaft PGA Series

SureGear® Precision Servo Gearboxes – In-Line Shaft PGA Series

Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb-in])	Max. Acceleration Torque (N·m [lb-in])	Emergency Stop Torque (N·m [lb-in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia ($kg \cdot cm^2$)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor
PGA050-05A1	$398.00	50	5:1	single	9 [80]	18 [159]	35 [310]	5	4000	8000	290 [65]	330 [74]	0.036	95	90 °C [194 °F]	0.7 [1.5]	IP55	SVL-201(B)
PGA050-10A1	$419.00		10:1	single	6 [53]	12 [106]	30 [266]				360 [81]	450 [101]	0.030					
PGA050-15A1	$574.00		15:1	double	6 [53]	12 [106]	30 [266]	7			410 [92]	540 [121]	0.035	90		0.8 [1.8]		
PGA050-25A1	$574.00		25:1	double	9 [80]	18 [159]	35 [310]				490 [110]	640 [144]	0.034					
PGA070-05A1	$398.00	70	5:1	single	27 [239]	50 [443]	100 [885]	5	3000	6000	510 [115]	390 [88]	0.077	95		1.5 [3.3]		
PGA070-10A1	$419.00		10:1	single	18 [159]	35 [310]	80 [708]				640 [144]	530 [119]	0.056					
PGA070-15A1	$574.00		15:1	double	18 [159]	35 [310]	80 [708]				740 [166]	630 [142]	0.055	90		1.7 [3.7]		
PGA070-25A1	$574.00		25:1	double	27 [239]	50 [443]	100 [885]				870 [196]	790 [178]	0.053					
PGA070-05A2	$434.00		5:1	single	27 [239]	50 [443]	100 [885]				510 [115]	390 [88]	0.160	95		1.5 [3.3]		SVL-202(B) SVL-204(B)
PGA070-10A2	$434.00		10:1	single	18 [159]	35 [310]	80 [708]				640 [144]	530 [119]	0.140					
PGA070-15A2	$595.00		15:1	double	18 [159]	35 [310]	80 [708]				740 [166]	630 [142]	0.140	90		1.7 [3.7]		
PGA070-25A2	$595.00		25:1	double	27 [239]	50 [443]	100 [885]				870 [196]	790 [178]	0.130					
PGA070-05A3	$434.00		5:1	single	27 [239]	50 [443]	100 [885]				510 [115]	390 [88]	0.360	95		1.5 [3.3]		SVL-207(B)
PGA090-10A3	$514.00	90	10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	0.750			3.5 [7.7]		
PGA090-15A3	$679.00		15:1	double	50 [443]	80 [708]	200 [1770]				1400 [315]	1900 [427]	0.720	90		4.0 [8.8]		
PGA090-25A3	$679.00		25:1	double	75 [664]	125 [1106]	250 [2213]				1600 [360]	2200 [495]	0.710					
PGA090-05A4	$513.00		5:1	single	75 [664]	125 [1106]	250 [2213]				960 [216]	1200 [270]	2.900	95		3.5 [7.7]		SVL-210(B)
PGA090-10A4	$513.00		10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	2.800					
PGA090-05A5	$513.00		5:1	single	75 [664]	125 [1106]	250 [2213]				960 [216]	1200 [270]	2.900			3.5 [7.7]		SVM-210(B)
PGA090-10A5	$513.00		10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	2.800					
PGA120-15A4	$852.00	120	15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800	90		8.7 [19.2]		SVL-210(B)
PGA120-25A4	$852.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				2700 [607]	3700 [832]	2.800					
PGA120-15A5	$852.00		15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800			8.7 [19.2]		SVM-210(B)
PGA120-25A5	$852.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				2700 [607]	3700 [832]	2.800					
PGA120-05A6	$680.00		5:1	single	180 [1593]	330 [2921]	625 [5532]				1600 [360]	1900 [427]	11.000	95		7.8 [17.2]		SVM-220(B) SVM-230(B)
PGA120-10A6	$680.00		10:1	single	120 [1062]	225 [1991]	500 [4425]				2000 [450]	2500 [562]	11.000					
PGA155-10A6	$840.00	155	10:1	single	240 [2124]	470 [4160]	1000 [8851]		2000	4000	4700 [1057]	4100 [922]	11.000	95		16 [35.3]		
PGA155-15A6	$1,142.00		15:1	double	240 [2124]	470 [4160]	1000 [8851]				5400 [1214]	4900 [1102]	11.000	90		18 [40.0]		
PGA155-25A6	$1,142.00		25:1	double	360 [3186]	700 [6196]	1250 [11063]				6400 [1439]	6100 [1371]	11.000					

Sure gear Precision Servo Gearboxes

Dimensions – In-Line Shaft PGA Series



SureGear PGA Series In-Line Shaft Gearboxes Dimension Drawing

SureGear® Precision Servo Gearbox Dimensions – In-Line Shaft PGA Series (dimensions = mm [in])

Part Number	A	B	C	E	G	H	J	K	L	M	N	P	Q	R	S	T
PGA050-05A1 PGA050-10A1	88.5 [3.48]	42.0 [1.65]	24.5 [0.96]	4.0 [0.16]	Ø50.0 [Ø1.97]	Ø35.0 [Ø1.38]	Ø12.0 [Ø0.47]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø44.0 [Ø0.731]	M4-0.7x8	4.0 [0.16]	4.0 [0.16]
PGA050-15A1 PGA050-25A1	105.0 [4.13]	42.0 [1.65]	24.5 [0.96]	4.0 [0.16]	Ø50.0 [Ø1.97]	Ø35.0 [Ø1.38]	Ø12.0 [Ø0.47]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø44.0 [Ø0.731]	M4-0.7x8	4.0 [0.16]	4.0 [0.16]
PGA070-05A1 PGA070-10A1	112.0 [4.41]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-05A2 PGA070-10A2	115.0 [4.53]	65.0 [2.56]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]	5.0 [0.20]	Ø14.0 [Ø0.55]	M5-0.8x11	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-05A3	130.0 [5.12]	80.0 [3.15]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-15A1 PGA070-25A1	131.0 [5.16]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-15A2 PGA070-25A2	136.0 [5.35]	65.0 [2.56]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]	5.0 [0.20]	Ø14.0 [Ø0.55]	M5-0.8x11	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA090-10A3	153.0 [6.02]	80.0 [3.15]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-05A4 PGA090-10A4	170.0 [6.69]	100.0 [3.94]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-05A5 PGA090-10A5	165.0 [6.50]	130.0 [5.12]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-15A3 PGA090-25A3	175.0 [6.89]	80.0 [3.15]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA120-05A6 PGA120-10A6	225.0 [8.86]	180.0 [7.09]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA120-15A4 PGA120-25A4	231.5 [9.11]	100.0 [3.94]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA120-15A5 PGA120-25A5	231.5 [9.11]	130.0 [5.12]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA155-10A6	264.0 [10.39]	180.0 [7.09]	97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø140.0 [Ø5.51]	M10-1.50x28	12.0 [0.47]	8.0 [0.31]
PGA155-15A6 PGA155-25A6	298.5 [11.75]	180.0 [7.09]	97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø140.0 [Ø5.51]	M10-1.50x28	12.0 [0.47]	8.0 [0.31]

** Dimension with supplied bushing*

NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

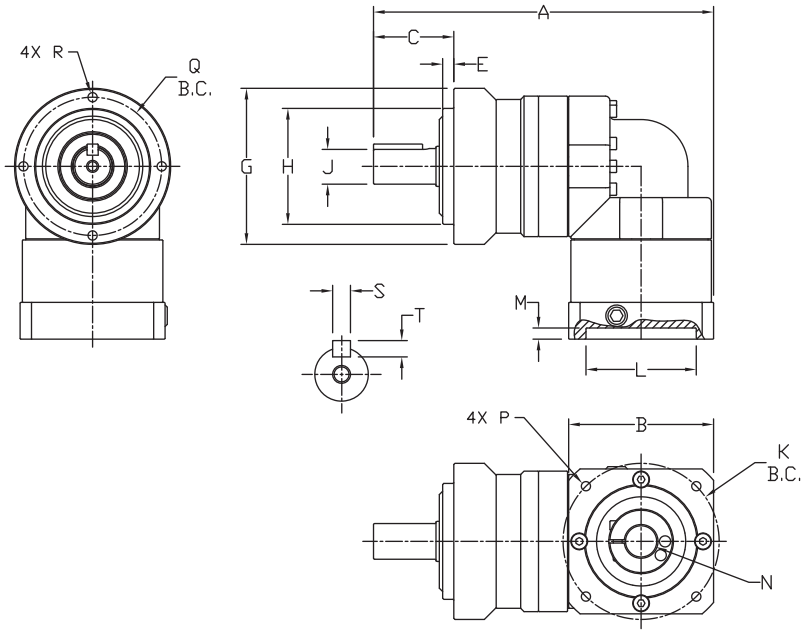
SureGear® Precision Servo Gearboxes

Pricing & Specifications – Right-Angle Shaft PGB Series

SureGear® Precision Servo Gearboxes – Right-Angle Shaft PGB Series																	
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm²)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor
PGB070-05A1	$674.00	70	5:1	double	22 [195]	40 [354]	80 [708]	6	3000	6000	510 [115]	390 [88]	0.250	93	90 °C [194 °F]	1.9 [4.2]	IP55	**SVL-201(B)**
PGB070-10A1	$674.00		10:1	double	16 [142]	32 [283]	65 [575]				640 [144]	530 [119]	0.230					
PGB070-15A1	$852.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.073	88		1.7 [3.7]		
PGB070-25A1	$852.00		25:1	triple	24 [212]	45 [398]	90 [797]				870 [196]	790 [178]	0.071					
PGB070-05A2	$674.00		5:1	double	22 [195]	40 [354]	80 [708]	6			510 [115]	390 [88]	0.320	93		1.9 [4.2]		**SVL-202(B) SVL-204(B)**
PGB070-10A2	$674.00		10:1	double	16 [142]	32 [283]	65 [575]				640 [144]	530 [119]	0.300					
PGB070-15A2	$852.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.118	88		1.7 [3.7]		**SVL-202(B)**
PGB070-25A2	$852.00		25:1	triple	24 [212]	45 [398]	90 [797]				870 [196]	790 [178]	0.115					
PGB090-15A2	$1,040.00	90	15:1	triple	45 [398]	65 [575]	170 [1505]	9			1400 [314]	1900 [427]	0.410	88		4.3 [9.5]		**SVL-202(B) SVL-204(B)**
PGB090-25A2	$1,040.00		25:1	triple	65 [575]	110 [974]	220 [1947]				1600 [360]	2200 [495]	0.400					
PGB090-05A3	$797.00		5:1	double	65 [575]	90 [797]	220 [1947]	6			960 [216]	1200 [270]	2.130	93		4.9 [10.8]		**SVL-207(B)**
PGB090-10A3	$797.00		10:1	double	45 [398]	65 [575]	170 [1505]				1200 [270]	1600 [360]	2.020					
PGB090-15A3	$1,040.00		15:1	triple	45 [398]	65 [575]	170 [1505]	9			1400 [314]	1900 [427]	0.600	88		4.3 [9.5]		
PGB090-25A3	$1,040.00		25:1	triple	65 [575]	110 [974]	220 [1947]				1600 [360]	2200 [495]	0.590					
PGB090-05A4	$797.00		5:1	double	65 [575]	90 [797]	220 [1947]	6			960 [216]	1200 [270]	4.260	93		4.9 [10.8]		**SVL-210(B)**
PGB090-10A4	$797.00		10:1	double	45 [398]	65 [575]	170 [1505]				1200 [270]	1600 [360]	4.150					
PGB120-15A4	$1,293.00	120	15:1	triple	110 [974]	200 [1770]	450 [3983]	9			2300 [517]	3000 [674]	4.700	88		10 [22]		
PGB120-25A4	$1,293.00		25:1	triple	150 [1328]	300 [2655]	550 [4868]				2700 [607]	3700 [832]	4.640					
PGB120-05A5	$1,040.00		5:1	double	120 [1062]	240 [2124]	500 [4425]	6			1600 [360]	1900 [427]	6.610	93		10.2 [22.5]		**SVM-210(B)**
PGB120-10A5	$1,040.00		10:1	double	110 [974]	200 [1770]	450 [3983]				2000 [450]	2500 [562]	6.050					
PGB120-15A5	$1,293.00		15:1	triple	110 [974]	200 [1770]	450 [3983]	9			2300 [517]	3000 [674]	4.700	88		10 [22]		
PGB120-25A5	$1,293.00		25:1	triple	150 [1328]	300 [2655]	550 [4868]				2700 [607]	3700 [832]	4.640					
PGB120-05A6	$1,040.00		5:1	double	120 [1062]	240 [2124]	500 [4425]	6			1600 [360]	1900 [427]	13.690	93		10.2 [22.5]		**SVM-220(B) SVM-230(B)**
PGB120-10A6	$1,040.00		10:1	double	110 [974]	200 [1770]	450 [3983]				2000 [450]	2500 [562]	13.120					
PGB155-15A6	$1,514.00	155	15:1	triple	200 [1770]	400 [3540]	750 [6638]	9	2000	4000	5400 [1214]	4900 [1102]	15.070	88		20.4 [45.0]		**SVM-220(B)**
PGB155-25A6	$1,514.00		25:1	triple	300 [2655]	600 [5310]	1100 [9736]				6400 [1439]	6100 [1371]	14.820					
PGB155-05A6	$1,198.00		5:1	double	200 [1770]	400 [3540]	1100 [9736]	6			3800 [854]	3000 [674]	21.280	93		19.8 [43.7]		**SVM-220(B) SVM-230(B)**
PGB155-10A6	$1,198.00		10:1	double	200 [1770]	400 [3540]	750 [6638]				4700 [1057]	4100 [922]	19.030					

Sure gear Precision Servo Gearboxes

Dimensions – Right-Angle Shaft PGB Series



SureGear PGB Series Right-Angle Shaft Gearboxes Dimension Drawing

SureGear® Precision Servo Gearbox Dimensions – Right-Angle Shaft PGA Series (dimensions = mm [in])

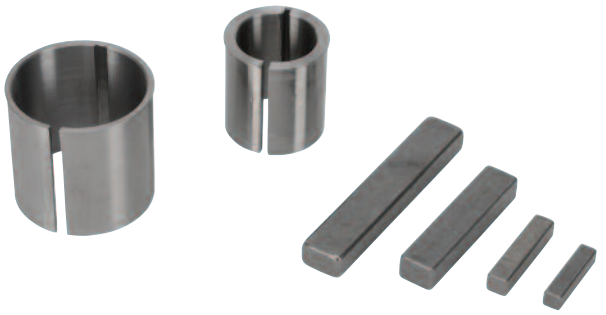
Part Number	A	B	C	E	G	H	J	K	L	M	N	P	Q	R	S	T
PGB070-05A1 PGB070-10A1	151.5 [5.96]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGB070-05A2 PGB070-10A2		65.0 [2.56]						Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]		Ø14.0 [Ø0.55]	M5-0.8x11				
PGB070-15A1 PGB070-25A1	158.0 [6.22]	52.0 [2.05]						Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]		Ø8.0 [Ø0.31]	M4-0.7x9				
PGB070-15A2 PGB070-25A2	163.5 [6.44]	65.0 [2.56]						Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]		Ø14.0 [Ø0.55]	M5-0.8x11				
PGB090-15A2 PGB090-25A2	204.5 [8.05]		46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]						Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGB090-05A3 PGB090-10A3	205.5 [8.09]	80.0 [3.15]						Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13				
PGB090-15A3 PGB090-25A3	210.5 [8.29]															
PGB090-05A4 PGB090-10A4	205.5 [8.09]	100.0 [3.94]						Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGB120-15A4 PGB120-25A4	272.0 [10.71]		70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]									
PGB120-05A5 PGB120-10A5	266.0 [10.47]	130.0 [5.12]						Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]							
PGB120-15A5 PGB120-25A5	272.0 [10.71]															
PGB120-05A6 PGB120-10A6	268.5 [10.57]	180.0 [7.09]						Ø200.0 [Ø7.87]	Ø114.0 [Ø4.50]		Ø35.0 * [Ø1.38]	M12-1.75x25				
PGB155-05A6 PGB155-10A6	341.0 [13.43]		97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]						Ø140.0 [Ø5.51]	M10-1.5x20	12.0 [0.47]	
PGB155-15A6 PGB155-25A6	364.0 [14.33]															

** Dimension with supplied bushing*

NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

SureGear® Precision Servo Gearboxes

SureGear® Servo Gearbox Replacement Parts



SureGear® Precision Servo Gearboxes – Replacement Parts		
Part Number	***Price***	***Description***
PG050-KEY	$4.00	Output Shaft Key, replacement, 4 x 4 x 14 mm, for SureGear PGA050 series gearboxes.
PG070-KEY	$4.00	Output Shaft Key, replacement, 5 x 5 x 22 mm, for SureGear PGA070 and PGB070 series gearboxes.
PG090-KEY	$4.00	Output Shaft Key, replacement, 6 x 6 x 28 mm, for SureGear PGA090 and PGB090 series gearboxes.
PG120-KEY	$4.00	Output Shaft Key, replacement, 10 x 8 x 45 mm, for SureGear PGA120 and PGB120 series gearboxes.
PG155-KEY	$4.00	Output Shaft Key, replacement, 12 x 8 x 65 mm, for SureGear PGA155 and PGB155 series gearboxes.
PGA4-A5-BUSH	$19.00	Input Shaft Bushing, replacement, 28 x 22 x 30.5 mm, for all SureGear gearboxes using SVL-210(B) and SVM-210(B) SureServo motors.
PGA6-BUSH	$19.00	Input Shaft Bushing, replacement, 38 x 35 x 36 mm, for all SureGear gearboxes using SVM-220(B) and SVM-230(B) SureServo motors.

SureServo® AC Servo System Accessories

Accessories

External Regeneration Resistors

Use external resistors to provide additional regenerative capacity and to dissipate heat away from the servo drive.

Part Number	Resistance	SureServo Drives	Price
GS-25P0-BR	40Ω	SVA-2040	$75.00
GS-2010-BR-ENC	20Ω	SVA-2100, SVA-2300	$223.00

Resistor GS-25P0-BR

AC Line Filters

Input EMI filters reduce electromagnetic interference or noise on the input side of the servo drive. They are required for CE compliance and recommended for installations prone to or sensitive to electromagnetic interference.

SureServo® Drives	AC Input Power	EMI Filter Rating	EMI Filter Part Number	Price
SVA-2040	Single-Phase	250V, 1-phase, 20A	20DRT1W3S	$76.00
	Three-Phase	250V, 3-phase, 10A	10TDT1W4C	$81.00
SVA-2100	Single-Phase	250V, 1-phase, 20A	20DRT1W3S	$76.00
	Three-Phase	250V, 3-phase, 10A	10TDT1W4C	$81.00
SVA-2300	Three-Phase	250V, 3-phase, 26A	26TDT1W4C	$113.00

NOTE: *These EMI Filters are electrically compatible with the SureServo drives. However, they are intended to be mounted next to the servo drive. Do not mount the filter under the drive. The drive mounting holes on these units are intended to be used only with AutomationDirect's line of VFDs.*

AC Line Filter 10TD1W4C

Edison Fuses & Fuji Contactors

SureServo® Drives	Input Type	Input Voltage	Edison Fuse - Class CC	Price*	Contactor**	Price
SVA-2040	Main Input Power	230V 3-Phase	HCTR4	$86.00	SC-E02-xxx	varies
SVA-2100			HCTR7-5	$98.00	SC-E03-xxx	varies
SVA-2300			HCTR15	$80.00	SC-E04-xxx	varies
SVA-2040		230V 1-phase	HCTR4	$86.00	SC-E02-xxx	varies
SVA-2100			HCTR10	$87.00	SC-E03-xxx	varies
SVA-2040 SVA-2100 SVA-2300	Control Input Power	230V 1-phase	HCTR2-5	$89.00		

* Fuses are sold in packages of 10.

** Note: For contactors, xxx = coil voltage (for example, SC-E02-220VAC).

Edison Fuse HCTRx

Fuji Contactor SC-E02-xxx

ZIPLink Wiring Solutions

Wiring Solutions using the *ZIP*Link Wiring System

ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the ZIPLink System ranging from PLC I/O-to-ZIPLink Connector Modules that are ready for field termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of ZIPLink modules are provided with ZIPLink cables. See the following solutions to help determine the best ZIPLink system for your application.

Solution 1: Do-more, *Direct*LOGIC, CLICK and Productivity3000 I/O Modules to ZIPLink Connector Modules

When looking for quick and easy I/O-to-field termination, a ZIPLink connector module used in conjunction with a prewired ZIPLink cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.

Using the PLC I/O Modules to ZIPLink Connector Modules selector tables located in this section,

1. Locate your I/O module/PLC.
2. Select a *ZIP*Link Module.
3. Select a corresponding *ZIP*Link Cable.

Solution 2: Do-more, *Direct*LOGIC, CLICK and Productivity3000 I/O Modules to 3rd Party Devices

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the ZIPLink Pigtail Cables. ZIPLink Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.

Using the I/O Modules to 3rd Party Devices selector tables located in this section,

1. Locate your PLC I/O module.
2. Select a *ZIP*Link Pigtail Cable that is compatible with your 3rd party device.

Solution 3: GS Series and DuraPulse Drives Communication Cables

Need to communicate via Modbus RTU to a drive or a network of drives?

ZIPLink cables are available in a wide range of configurations for connecting to PLCs and *Sure*Servo, *Sure*Step, Stellar Soft Starter and AC drives. Add a ZIPLink communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,

1. Locate your Drive and type of communications.
2. Select a *ZIP*Link cable and other associated hardware.

ZIPLink Wiring Solutions

Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with DirectLOGIC, CLICK, and Productivity3000 CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the Serial Communications Cables selector table located in this section,

1. Locate your connector type
2. Select a cable.

Solution 5: Specialty *ZIP*Link Modules

For additional application solutions, ZIPLink modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and *Sure*Servo 50-pin I/O interface connection.

Using the ZIPLink Specialty Modules selector table located in this section,

1. Locate the type of application.
2. Select a ZIPLink module.

Solution 6: *ZIP*Link Connector Modules to 3rd Party Devices

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible ZIPLink Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the Universal Connector Modules and Pigtail Cables table located in this section,

1. Select module type.
2. Select the number of pins.
3. Select cable.

ZIPLINK AUTOMATIONDIRECT Motor Controller Communication

Drive / Motor Controller (GS/DuraPulse/SureServo/SureStep/Stellar) ZIPLink Selector							
Drive / Motor Controller		Communications			ZIPLink Cable		
Controller	Comm Port Type	Network/Protocol	Connects to	Comm Port Type	Cable (2 meter length)	Cable Connectors	Other Hardware Required
GS1	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	**GS-485HD15-CBL-2**	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	**GS-EDRV-CBL-2**	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	**GS-485RJ12-CBL-2**		–
			FA-ISOCON	5-pin Connector	**GS-ISOCON-CBL-2**	RJ12 to 5-pin plug	–
GS2	RJ12	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	**GS-RJ12-CBL-2**	RJ12 to RJ12	–
			DL05 PLCs				–
			DL06 PLCs	Port 2 (HD15)			**FA-15HD**
			D2-250-1 CPU				
			D2-260 CPU				
			D4-450 CPU	Port 3 (25-pin)			**FA-CABKIT**
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	**GS-485HD15-CBL-2**	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	**GS-EDRV-CBL-2**	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	**GS-485RJ12-CBL-2**		–
			FA-ISOCON	5-pin Connector	**GS-ISOCON-CBL-2**	RJ12 to 5-pin plug	–
DuraPulse (GS3)	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	**GS-485HD15-CBL-2**	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	**GS-EDRV-CBL-2**	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	**GS-485RJ12-CBL-2**		–
			FA-ISOCON	5-pin Connector	**GS-ISOCON-CBL-2**	RJ12 to 5-pin plug	–
Stellar (Soft Starter) SR44 Series	RJ45**	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	**SR44-485HD15-CBL-2**	RJ45 to HD15	**SR44-RS485**
			D2-250-1 CPU				
			D2-260 CPU				
			ZL-CDM-RJ12Xxx*	RJ12	**SR44-485RJ45-CBL-2**	RJ45 to RJ12	
SureServo	IEEE1394 (CN3)	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	**SVC-232RJ12-CBL-2**	6-pin IEEE to RJ12	–
			DL05 PLCs				–
			DL06 PLCs	Port 2 (HD15)			**FA-15HD**
			D2-250-1 CPU				
			D2-260 CPU				
			D4-450 CPU	Port 3 (25-pin)			**FA-CABKIT**
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	**SVC-485HD15-CBL-2**	6-pin IEEE to HD15	–
			D2-260 CPU				–
			ZL-CDM-RJ12Xxx*	RJ12	**SVC-485RJ12-CBL-2**	6-pin IEEE to RJ12	–
			USB-485M	RJ45	**SVC-485CFG-CBL-2**	6-pin IEEE to RJ45	–
SureStep	RJ12	RS-232 ASCII	DL06 PLCs	Port 2 (HD15)	**STP-232HD15-CBL-2**	HD15-pin to RJ12	–
			D2-250-1 CPU				–
			D2-260 CPU (Port2)				–
			DL05 PLCs	RJ12	**STP-232RJ12-CBL-2**	RJ12 to RJ12	–
			CLICK PLCs				–

When using the ZL-CDM-RJ12Xxx ZIPLink Communication Distribution Module, replace the lowercase xx with the number of RJ12 ports, i.e.4 for four ports or10 for ten ports. (ex: ZL-CDM-RJ12X4 or ZL-CDM-RJ12X10)

****The SR44-RS485 Communications Adapter must be installed for RS-485 communications with the Stellar soft starters.***